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80918 (US). **FORBES, Martin, L.** [US/US]; 993 Ridge Road, Divide, CO 80814 (US).

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(74) **Agent:** CHRISTENSEN, Douglas, J.; Patterson, Thuente, Skaar & Christensen, P.A., 4800 IDS Center, 80 South Eighth Street, Minneapolis, MN 55402-2100 (US).

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(71) **Applicant** (for all designated States except US): **ENTEGRIS, INC.** [US/US]; 3500 Lyman Boulevard, Chaska, MN 55318 (US).

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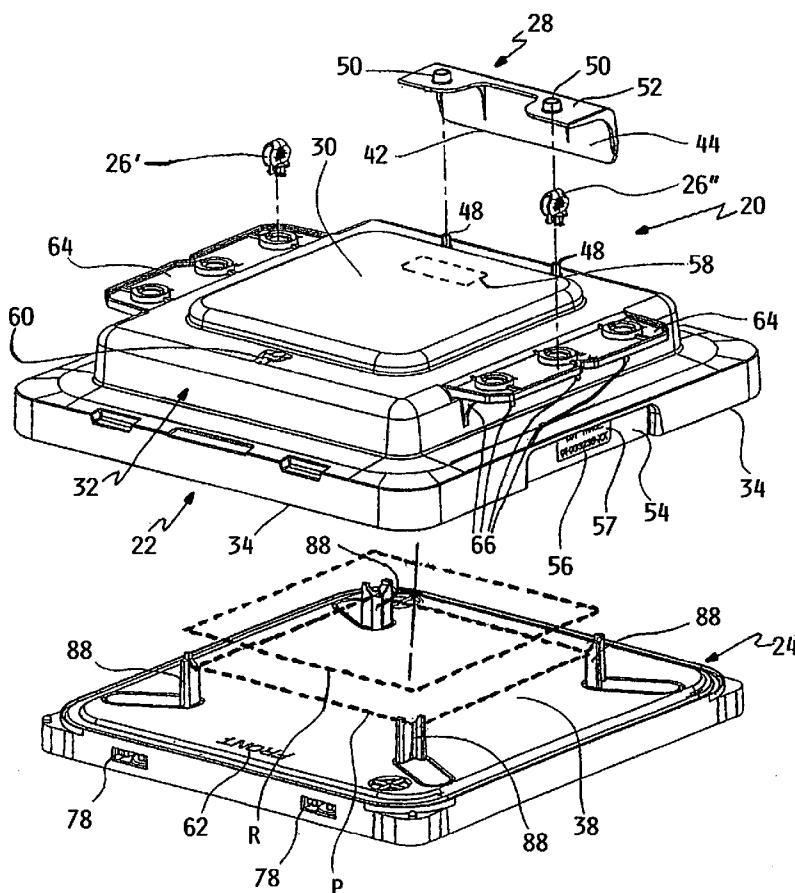
(72) Inventors; and

(75) **Inventors/Applicants (for US only):** BURNS, John
[US/US]; 6046 Bow River Drive, Colorado Springs, CO

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(54) Title: RETICLE POD WITH VISUALLY DIFFERENTIABLE ORIENTATION INDICATOR



(57) Abstract: A carrier for transferring work pieces in a semiconductor or reticle fabrication facility including a base having one or more supports adapted to operably support a work piece, a cover adapted to mate with the base to form an interior, and an indicator presented with the carrier and selectively changeable between a first indication and a second indication for visually differentiating an orientation of the work piece within the interior without opening the carrier. The work piece can comprise a reticle and the one or more supports can support the reticle in at least a first orientation and a second orientation.



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RETICLE POD WITH VISUALLY DIFFERENTIABLE ORIENTATION INDICATOR

RELATED APPLICATION

5 The present application claims the benefit of U.S. Provisional Application No. 60/814,473 filed June 16, 2006, which is incorporated herein in its entirety by reference.

FIELD OF THE INVENTION

10 The present invention relates generally to a container for transferring work pieces, such as in a semiconductor or reticle fabrication facility. More particularly, the present invention relates to a container with visually differentiable orientation indicator that can be used to visually identify the orientation of a work piece disposed within the container without opening the container.

BACKGROUND OF THE INVENTION

15 Semiconductor devices are generally composed of multiple individual patterned layers of silicon, silicon compounds, and metals. During the fabrication of these devices, the pattern for each of the patterned layers is contained on a mask called a reticle.

20 A reticle is an optically clear quartz substrate on which a pattern has been formed by photolithography or other such processes. In particular, a layer of photoresist is applied on a chrome coated reticle blank. Thereafter, the pattern for a particular layer to be formed on a semiconductor wafer is transferred onto the reticle as for example by a laser pattern generator or e-beam. After pattern generation on the photoresist, the exposed portions of the photoresist are removed to leave the unwanted portions of the chrome layer exposed. These unwanted portions are then etched away. The remaining photoresist is then removed in a process which leaves the clean pattern on the surface on the reticle.

25 To keep the surface of the reticle clean, a thin transparent sheet called a pellicle can be mounted a short distance away from the surface of the reticle containing the pattern. This can ensure that any microscopic dust that settles on the reticle will be out of

focus during the exposure process and therefore not affecting the pattern formed on the silicon wafer.

In semiconductor wafer fabrication facilities, reticles are often transferred in containers or pods that are configured to transfer individual or multiple reticles. The containers generally include a door or floor that mates with a cover or dome to provide a sealed environment in which the reticles can be stored and transferred. In order to transfer reticles between a container and a process tool within a fabrication facility, a pod is typically loaded either manually or with automation on a load port on a front of the process tool. Once the pod is positioned on the load port, mechanisms within the port door unlatch the door from the shell so that the reticle can be transferred from within the container into the process tool.

During processing, it can be important to know the orientation of the reticle and/or pellicle within the pod. For example, the pattern that is formed on the reticle has a certain orientation. When transferring reticles between a container and a process tool within a fabrication facility, it is often important to know how the reticle and pattern thereon are oriented within the pod. Also, it is often important to know whether the pellicle is up or down within the pod. However, it can be difficult to determine the orientation of a reticle and pellicle inside a carrier, especially an opaque carrier, without opening the container.

SUMMARY OF THE INVENTION

The reticle pod with a visually differentiable orientation indicator according to various embodiments of the present invention enables identification of orientation of the contents of a carrier by providing an indicator for visually differentiating the orientation of the reticle and/or pellicle within such pod without opening the pod. This can be especially useful in opaque reticle pods.

In an embodiment, a carrier for transferring work pieces in a semiconductor or reticle fabrication facility includes a base having one or more supports adapted to operably support a work piece, a cover adapted to mate with the base to form an interior, and an indicator presented with the carrier and selectively changeable between a first indication and a second indication for visually differentiating an orientation of the work piece within the interior without opening the carrier. In an embodiment, the work piece can comprise a

reticle and the one or more supports can support the reticle in at least a first orientation and a second orientation.

5 In an embodiment, a method of providing visual differentiation of an orientation of a work piece in a carrier includes providing a carrier having a base adapted to operably support a work piece, a cover adapted to sealingly mate with the base to form an interior, and an indicator adapted to be presented with the carrier such that it is selectively changeable between a first indication and a second indication, the first indication corresponding to a first orientation of the work piece and the second indication corresponding to a second orientation of the work piece. The method can further include
10 operably supporting the work piece on the base, identifying an orientation of the work piece, and presenting the indicator with the carrier in the first indication or the second indication depending up on whether the work piece is oriented in the first orientation or the second orientation. In an embodiment, the work piece can comprise a reticle and the one or more supports can support the reticle in at least a first orientation and a second
15 orientation.

In another embodiment, a pod with one or more visually differentiable orientation indicators that can be used to visually identify an orientation of a reticle disposed within the pod without opening the pod includes a door having one or more supports adapted to operably support a reticle, a dome adapted to mate with the door to form an interior, and
20 an indicator presented with the carrier and selectively changeable between a first indication and a second indication for visually differentiating an orientation of the at least one of the pellicle or the reticle. In an embodiment, the one or more supports can support the reticle in at least a first orientation and a second orientation.

In an embodiment, the cover can include one or more flanges thereon, the indicator
25 presented with the one or more flanges, such that the indicator is visible by looking at the cover. In another embodiment, a first aperture and a second aperture can be presented with the one or more flanges, each aperture adapted for the indicator, such that the first indication corresponds to when the indicator is presented with the first aperture and the second indication corresponds to when the indicator is presented with the second aperture.

30 In a further embodiment, the presence of one or more visually differentiable orientation indicators, the positioning of the one or more visually differentiable orientation

indicators, the color of the one or more visually differentiable orientation indicators, and the inclusion of one or more machine readable structures in the one or more visually differentiable orientation indicators can provide multiple levels of information about the reticle pod and the contents thereof. If one of the multiple levels of information is not
5 available at any given moment, the additional or alternative multiple levels of information can provide the desired information.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention can be more completely understood in consideration of the following detailed description in connection with the accompanying
10 drawings, in which:

Fig. 1 is an exploded top perspective view of a reticle pod according to a first embodiment;

Fig. 2 is an exploded bottom perspective view of the reticle pod of Fig. 1;

Fig. 3 is a top perspective view of a dome of the reticle pod of Fig. 1;

15 Fig. 4 is a close-up perspective view of an automation side flange of the dome of Fig. 3;

Fig. 5 is a top plan view of the dome of Fig. 3;

Fig. 6 is a bottom plan view of the dome of Fig. 3;

Fig. 7 is a side elevational view of the dome of Fig. 3;

20 Fig. 8 is a cross-sectional view of the dome of Fig. 5 taken along line 8-8;

Fig. 9 is a cross-sectional view of the dome of Fig. 6 taken along line 9-9;

Fig. 10 is a cross-sectional view of the dome of Fig. 6 taken along line 10-10;

Fig. 11 is a top plan view of a reticle pod dome according to a second embodiment;

Fig. 12 is first top perspective view of a visually differentiable indicator in the form of an information plug for use with a reticle pod;

Fig. 13 is second top perspective view of the information plug of Fig. 12;

Fig. 14 is a front elevational view of the plug of Fig. 12;

5 Fig. 15 is a side elevational view of the plug of Fig. 12;

Fig. 16 is a bottom plan view of the plug of Fig. 12; and

Fig. 17 is a front elevational view of a visually differentiable indicator in the form of an information plug according to a second embodiment.

10 While the embodiments are amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present invention.

15 DETAILED DESCRIPTION OF THE DRAWINGS

Referring to Figs. 1-2, a reticle container 20 (alternatively referred to as, for example, a reticle pod or carrier) generally includes a cover 22 (alternately referred to as, for example, a dome) capable of sealingly mating with a door 24 (alternately referred to as, for example, a base or floor) to define an interior, such as a generally hermetically
20 sealed environment, within the reticle container 20 for storing, transporting, and/or shipping a reticle optionally including a pellicle therein in a semiconductor or reticle fabrication facility (reticle R and pellicle P depicted schematically in phantom lines in Fig. 1).

25 Using the fabrication of integrated circuits as an example, photolithographic and projection printing techniques are used. In photolithography, an image positioned on the reticle or mask is projected onto a wafer such as a silicon wafer having a photosensitive resist thereon. The reticle is used to transfer a desired image onto the silicon wafer. The

semiconductor wafer surface is coated with photosensitive resist in a desired pattern so that an image can be etched thereon. The pellicle comprising a transparent material can be used in combination with the reticle to protect the reticle surface from damage. A frame (not depicted) can be interposed between the pellicle and the reticle which are bonded to the frame. The pellicle is mounted on the frame opposite a corresponding reticle to form an air gap between the reticle and pellicle. Further details of reticles and pellicles are included in U.S. Patent No. 7,052,809, which is incorporated herein in its entirety by reference.

One or more visually differentiable orientation indicators 26 (such as in the form of information plugs as described below) and a license plate 28 can be used in conjunction with the reticle container 20 to carry information about the orientation of the reticle and pellicle and information about the reticle container 20 and/or the reticle/pellicle contained therein, respectively.

Referring to Figs. 1, the cover 22 generally includes a top wall 30 and a side wall 32 extending from the top wall 30 and terminating in a peripheral edge 34. Referring to Fig. 2, the top and side walls 30, 32 can partially define an interior or internal cavity, the cover 22 having an internal surface 36 presented therein. As described above, by sealingly mating the cover 22 with the door 24, an operator can create a hermetically sealed, controlled environment in the internal cavity defined between the inner surface 36 of the cover 22 and an upper surface 38 of the door 24 (Fig. 1).

Referring to Figs. 1, 3, and 5, the side wall 32 of the cover 22 can comprise a license plate holder 40 for operably retaining a lower edge 42 of a generally vertical portion 44 of a license plate 28 thereon. Such a license plate 28 as depicted in Fig. 1 can comprise information about the reticle container 20 or the reticle or pellicle contained therein. The top wall 30 of the cover 22 can comprise one or more license plate bosses 48 for further operably retaining the license plate 28 thereon in conjunction with the license plate holder 40 on the side wall 32. The license plate bosses 48 can operably couple apertures 50 included on a generally horizontal portion 52 of the license plate 28.

Referring to Figs. 1 and 7, lower portions of the side wall 32 of the cover 22 proximate the peripheral edge 34 can comprise one or more handle recesses 54 defined therein for compliance with SEMI ("Semiconductor Equipment and Materials

International") standards for automated use with various types of wafer-fabrication equipment. Such handle recesses 54 can include serial number information 56 therein for identifying the reticle container 20 or the reticle and/or pellicle contained therein. The serial number information 56 can be formed directly in the handle recesses 54 on the side wall 30 or can be included on a sticker or plate 57 operably attached thereto as depicted in Figs. 1, 2, and 7.

Referring to Figs. 1, 3, and 5, the top wall 30 of the cover 22 can comprise source and/or orientation logos 58, 60 thereon. The source logo 58 can be used to identify the source of the reticle container 20 and the orientation logo 60 can be used to identify a general orientation of the reticle container 20, and thus the contents thereof, such as a reticle and/or pellicle. For example, an orientation logo 60 representative of the "front" of the reticle container 20 can be used in conjunction with a corresponding logo 62 on the upper surface 38 of the door 24 (such as "FRONT") to ensure that the cover 22 is placed properly on the door 24. This can inhibit or prevent damage to any contents in the reticle container 20, such as a reticle, pellicle, and/or wafer, when placing the cover 22 on the door 24.

Referring to Figs. 1-5, upper portions of the side wall 32 can include automation flanges 64 extending therefrom. The automation flanges 64 can be structurally supported by a plurality of support ribs 66. Referring to Fig. 3 and 4, the automation flanges 64 can include an alignment notch or feature 68 and a plurality of information plug apertures 70 defined thereon. The alignment feature 68 can be utilized with various types of wafer-fabrication equipment to ensure proper alignment of the reticle container 20 and contents thereof with the equipment. The alignment features 68 can be included for compliance with an industry standard, such as listed in SEMI standards.

The information plug apertures 70 can be used to operably retain information plugs 26 (Figs. 1 and 12-16) relating to the orientation of the reticle and/or pellicle contained within the reticle container 20 and/or additional information about the reticle container 20 or process steps. Each of the information plug apertures 70 can include extensions 72 defined therein for enabling extensions on flanges of the information plugs 26 to operably couple thereto to secure the information plug 26 in the information plug aperture 70 once inserted. The information plugs 26 and their use in conjunction with the information plug apertures 70 are described in greater detail below. Each of the information plug apertures

can also include a aperture label 74 relating thereto, such as, for example, "SN," "P Down," or "P Up," representing "serial number" for reticle orientation, pellicle up for pellicle orientation relative to reticle (i.e., pellicle presented with an upper surface of said reticle), or pellicle down for pellicle orientation relative to reticle (i.e., pellicle is presented
5 with a lower surface of said reticle), respectively.

The visually differentiable orientation indicator can comprise other structures, such as snap-on clips, sliding parts, or toggleable parts. The visually differentiable orientation indicator in their various forms can be included on the automation flange(s) included on the dome of the reticle carrier. This positioning can provide ready visual access and easy
10 manual or robotic access to the indicator plugs. Structures other than plugs, clips, or sliding or toggleable parts can be used for the visually differentiable orientation indicator. The visually differentiable orientation indicators can be included on different positions (other than on the automation flanges) on the door or cover of the carrier.

As depicted in the figures, the cover 22 includes four reticle orientation
15 information plug apertures 70a (one at each corner of the container) and two pellicle orientation information plug apertures 70b (one each for pellicle up and pellicle down). The information plug apertures 70 can be positioned at other positions on the reticle container 20 and/or that the automation flanges 64 can be positioned at other positions on the reticle container 20. In addition, more or less than the depicted number of information
20 plug apertures 70 can be used.

Referring to Figs. 2, 6, and 8-10, the internal surface 36 of the cover 22 can include a number of features for operably coupling and sealingly mating the cover 22 with the door 24. For example, referring to Figs. 2, 6, and 9, the internal surface 36 of the cover 22 can include a number of latch recesses 76 (alternatively referred to as latch receiver
25 portions) for operably coupling latches 78 included on the door 24. Examples of such latches 78 can be seen in Figs. 1 and 2 and are further described in U.S. Patent Nos. 5,957,292 and 4,995,430, both of which are incorporated herein by reference in their entirety.

In addition, referring to Fig. 6, the internal surface 36 can further include a
30 downwardly projecting knife edge 80 for sealingly mating the cover 22 with the door 24. When the cover is placed on the door, the knife edge 80 can interact with an elastomeric

seal member (not depicted) included on the upper surface 38 of the door 24 to form the above-mentioned hermetically sealed environment.

Referring to Figs. 2, 6, and 8, The internal surface 36 can further include a plurality of pairs of bosses 82 and posts 84 for operably coupling reticle retainers 86 that can be utilized with various types of wafer-fabrication equipment and in conjunction with posts 88 included on the door 24 (Fig. 2) for operable retaining the reticle in the reticle container 20. Referring to Figs. 2, 6, and 8-10, the internal surface 36 can additionally include a plurality of structural ribs 92 disposed thereon for providing structure and stability to the cover 22. The internal surface 36 can further include door alignment ribs 94 proximate corners of the cover 22 for aligning and mating the cover 22 with the door 24 to form the hermetically sealed environment therein.

The door 24 is provided with features to comply with SEMI standards for automated use with various types of wafer-fabrication equipment. The door 24 is adapted to be removably coupled to the cover 22 by a door-latch mechanism having a latch 78 capable of being opened by a SEMI conformable latch opening device (not depicted), such as described in U.S. Patent Nos. 5,957,292 and 4,995,430, both of which are incorporated herein by reference in their entirety.

The reticle container 20 elements (such as the cover 22 and/or door 24) can be formed of a durable polymer by a process of injection molding or other suitable manufacturing process. Such a polymer can include carbon-filled polyetheretherketone ("PEEK"). In other embodiments, the reticle container 20 elements (such as the cover 22 and/or door 24) can also be formed of static dissipative, carbon-filled polycarbonate. Other static dissipative fillers or additives can include carbon powders or fibrils or thermoplastic compound sold under the name of PERMASTAT® by RTP Company.

Alternatively, the polymer can be clear to allow the viewing of reticle within the reticle container 20. An example of a transparent, static dissipative material from which the pod elements can be formed is polymethyl methacrylate. As a further alternative, the pod elements can be formed of clear polycarbonate. As an alternative to polycarbonate, the pod elements can be formed of flame retardant polyetherimide. The pod elements can be formed of other materials in alternative embodiments. In addition, while the

components can be formed by injection molding, other known methods of manufacture are also contemplated.

Referring to Fig. 11, in a second embodiment, the cover 22' includes one or more stacking features 122 on the exterior surface of the top wall 30'. The stacking features 122 can be used for the stacking of containers, e.g., stacking a first reticle container and a second container.

Referring to Figs. 12-16, the visually differentiable orientation indicator in the form of information plugs 26 generally include a body 96, flanges 98 with extensions 100 defined thereon, and legs 102 extending from the body 96 generally below the flange, the legs 102 each having a foot 104 extending therefrom.

Referring to Figs. 12-15, the body 96 generally comprises an outer surface 106 having grip ribs 108 defined thereon and a generally opposed inner surface 110. The inner surface 110 can include a flex rib 112 thereon and extending downwardly from the inner surface 110 to an inner surface 114 of the legs 102. The flex rib 112 can include a pad 116 at each of two ends 118, 120 thereof.

The information plugs 26 can be constructed of any color and can correspond to the process step or steps at which the pod 20 is loaded or being used. For example, a green plug can represent a first process step, a red plug can represent a second process step, and an amber plug can represent a third process step. By looking at the color of the information plugs 26, an operator can determine the process step at which the pod 20 was loaded or being used. The information plugs 26 can be formed of a durable polymer by a process of injection molding or other suitable manufacturing process. Such a polymer can include polycarbonate. It is understood that the information plugs 26 can be formed of other materials in alternative embodiments. In addition, while the information plugs 26 can be formed by injection molding, other forming methods can be used.

To insert an information plug 26 into an information plug aperture 70, an operator can grab the information plug 26 generally at the grip ribs 108 of the body 96 and squeeze the legs 102 together, such as until the pads 116 come together. The legs 102 of the information plug 26 can then be inserted into an information plug aperture 70 until the flange 98 and the extensions 100 operably couple the information plug aperture 70 and

extension 72 in the information plug aperture 70. The flange 98 can inhibit or prevent the plug 26 from being inserted too far into the information plug aperture 70. The grip can then be released such that the flex rib 112 returns the legs 102 on the plug 26 to their original position. The feet 104 are then expanded on an underside of the automation
5 flange 64 inhibiting the plug 26 from being removed upwardly from or falling from the information plug aperture 70 when upside down. The plug 26 can generally snap into place. In other embodiments, the plug 26 can be twisted into place.

To remove the plug 26, an operator can grab the plug 26 generally at the grip ribs 108 and squeeze the legs 102 together such as until the pads 108 come together. The plug
10 26 can then be removed from the information plug aperture 70 by passing legs 102 and feet 104 back upwardly through the information plug aperture 70.

In use, an operator places a reticle (and optionally a pellicle) in the reticle container 20. When the cover 22 is placed on the door 24 to create the sealed chamber, a first information plug 26' can be placed in the appropriate information plug aperture 70 to
15 indicate the position of the serial number on the reticle, and thus the orientation of the reticle within the container 20. A second information plug 26" can be placed in the appropriate information plug aperture 70 to indicate whether the pellicle is up or down relative to reticle. As a result, while the reticle and pellicle might not be viewable through an opaque reticle container 20, an operator can determine the orientation of each of the
20 reticle and pellicle by looking at the information plugs 26', 26" and the information plug apertures 70', 70" in which information plugs 26', 26" are positioned. In addition, depending upon what color(s) of plugs are used, an operator can determine the process step at which the pod was loaded or being used.

Referring to Fig. 17, in a second embodiment, a visually differentiable orientation
25 indicator in the form of a information plug 26' further includes a machine readable indicator 124 disposed on or formed in the body 96' of the plug 26'. Some examples of said machine readable indicator 124 include a RFID tag, a smart chip, but are not limited to such. Said machine readable indicator 124 can provide a further level of indication in addition to or in lieu of the visually differentiable indicator. There can also be further
30 machine readable indicators (not depicted), such as a RFID tag and/or a smart chip included on the dome or cover that can be used in conjunction with the machine readable indicator 124.

The presence of the visually differentiable orientation indicator(s), the positioning of the visually differentiable orientation indicator(s), the color of the visually differentiable orientation indicator(s), and the inclusion of machine readable structure(s) in the visually differentiable orientation indicator(s) can provide multiple levels of information about the reticle pod and the contents thereof. If one of the multiple levels of information is not available at any given moment, the additional or alternative multiple levels of information can provide information.

For example, if the visually differentiable orientation indicator(s) were not visible at any given moment, the machine readable visually differentiable orientation indicator(s) could provide the necessary information about the pod, such as the orientation of the reticle and/or pellicle within the pod. In addition, in a system or process step without a human operator, the machine readable visually differentiable orientation indicator(s) could provide the necessary information about the pod, such as the orientation of the reticle and/or pellicle within the pod.

The reticle container and components thereof as described herein can be used with SMIF, FOUPS, FOSBS, and other controlled environment containers that are used in the semiconductor processing industry or other similar industries. In addition, the invention has been described above with reference to several embodiments thereof. Alterations can be made in the embodiments described without departing from the scope of the invention. Thus, the scope of the present invention should not be limited by the embodiments described herein, but rather by the language of the claims and the equivalents of those structures.

Claims

What is claimed is:

1. A carrier for transferring reticles, said carrier comprising:

a base comprising one or more supports adapted to operably support a reticle in at least a first orientation and a second orientation;

a cover adapted to mate with said base to form an interior; and

an indicator presented with said carrier and selectively changeable between a first indication and a second indication for visually differentiating whether said reticle is in said first orientation or said second orientation within said interior without opening said carrier.

2. The carrier of claim 1, wherein said reticle is presented with a pellicle, said first orientation corresponding to when said pellicle is presented with an upper surface of said reticle and said second orientation corresponding to when said pellicle is presented with a lower surface of said reticle.

3. The carrier of claim 1, wherein said one or more supports are further adapted to operably support said reticle in a third orientation and a fourth orientation, said indicator being further selectively changeable between a third indication and a fourth indication, said third indication corresponding to when said reticle is oriented in said third orientation and said fourth indication corresponding to when said reticle is oriented in said fourth orientation.

4. The carrier of claim 1, further comprising a first indicator position and a second indicator position, each adapted for said indicator, such that said first indication corresponds to when said indicator is presented with said first indicator position and said

second indication corresponds to when said indicator is presented with said second indicator position.

5. The carrier of claim 4, wherein said one or more supports are further adapted to operably support said reticle in a third orientation and a fourth orientation, said indicator being further selectively changeable between a third indication and a fourth indication, said carrier further comprising a third indicator position and a fourth indicator position, each adapted for said indicator, such that said third indication corresponds to when said indicator is presented with said third indicator position and said fourth indication corresponds to when said indicator is presented with said fourth indicator position.

6. The carrier of claim 5, wherein said first indication corresponding to when said reticle is in a first orientation, said second indication corresponding to when said reticle is in a second orientation, said third indication corresponding to when said reticle is in a third orientation and said fourth indication corresponding to when said reticle is in a fourth orientation.

7. The carrier of claim 6, wherein said first, second, third, and fourth orientations correspond to first, second, third, and fourth orientations of said reticle relative to a serial number included on said reticle.

8. The carrier of claim 1, further comprising a first aperture and a second aperture presented with a portion thereof, each aperture adapted for said indicator, such that said first indication corresponds to when said indicator is presented with said first aperture and said second indication corresponds to when said indicator is presented with said second aperture.

9. The carrier of claim 8, wherein said indicator comprises a plug.
10. The carrier of claim 8, wherein said one or more supports are further adapted to operably support said reticle in a third orientation and a fourth orientation, said indicator being further selectively changeable between a third indication and a fourth indication, said carrier further comprising a third aperture and a fourth aperture, each adapted for said indicator, such that said third indication corresponds to when said indicator is presented with said third aperture and said fourth indication corresponds to when said indicator is presented with said fourth aperture.
11. The carrier of claim 1, wherein said cover comprises one or more flanges thereon, said indicator presented with said one or more flanges, such that said indicator is visible by looking at said cover.
12. The carrier of claim 11, wherein said cover further comprises a first aperture and a second aperture presented with said one or more flanges, each aperture adapted for said indicator, such that said first indication corresponds to when said indicator is presented with said first aperture and said second indication corresponds to when said indicator is presented with said second aperture.
13. The carrier of claim 12, wherein said indicator comprises a plug.
14. The carrier of claim 1, wherein said indicator comprises a characteristic indicating a process step at which said carrier corresponds at an identification time.

15. The carrier of claim 14, wherein said characteristic comprises color.
16. The carrier of claim 15, wherein a first color is used to represent a first process step and a second color is used to represent a process step subsequent to said first process step.
17. The carrier of claim 1, further comprising a second indicator providing information about at least one of said carrier or said reticle.
18. A method of providing visual differentiation of an orientation of a reticle in a carrier, said method comprising:
- providing a carrier comprising a base comprising one or more support members adapted to operably support a reticle in at least a first orientation and a second orientation, a cover adapted to sealingly mate with said base to form an interior, and an indicator adapted to be presented with said carrier such that it is selectively changeable between a first indication and a second indication, said first indication corresponding to said first orientation and said second indication corresponding to said second orientation;
- operably supporting said reticle on said one or more support members and identifying an orientation of said reticle;
- presenting said indicator with said carrier in said first indication or said second indication depending up on whether said reticle is oriented in said first orientation or said second orientation.
19. The method of claim 18, wherein said one or more supports are further adapted to operably support said reticle in a third orientation and a fourth orientation, said indicator being further selectively changeable between a third indication and a fourth indication, said third indication corresponding to said third orientation of said reticle and said fourth

indication corresponding to said fourth orientation of said reticle, said method further comprising:

presenting said indicator with said carrier in said first, second, third, or fourth indication depending up on whether said reticle is oriented in said first, second, third, or fourth orientation.

20. The method of claim 18, wherein said reticle is presented with a pellicle, said first orientation corresponding to when said pellicle is presented with an upper surface of said reticle and said second orientation corresponding to when said pellicle is presented with a lower surface of said reticle, said method further comprising:

presenting said indicator with said carrier in said first indication or said second indication depending up on whether said wherein said reticle is oriented in said first orientation or said second orientation.

21. The method of claim 20, wherein said one or more supports are further adapted to operably support said reticle in a third orientation and a fourth orientation, said indicator being further selectively changeable between a third indication and a fourth indication, said third indication corresponding to said third orientation of said reticle and said fourth indication corresponding to said fourth orientation of said reticle, said method further comprising:

presenting said indicator with said carrier in said first, second, third, or fourth indication depending up on whether said reticle is oriented in said first, second, third, or fourth orientation.

22. A pod with one or more visually differentiable orientation indicators that can be used to visually identify an orientation of a reticle disposed within said pod without opening said pod, said pod comprising:

a door comprising one or more supports adapted to operably support a reticle in at least a first orientation and a second orientation;

a dome adapted to mate with said door to form an interior; and

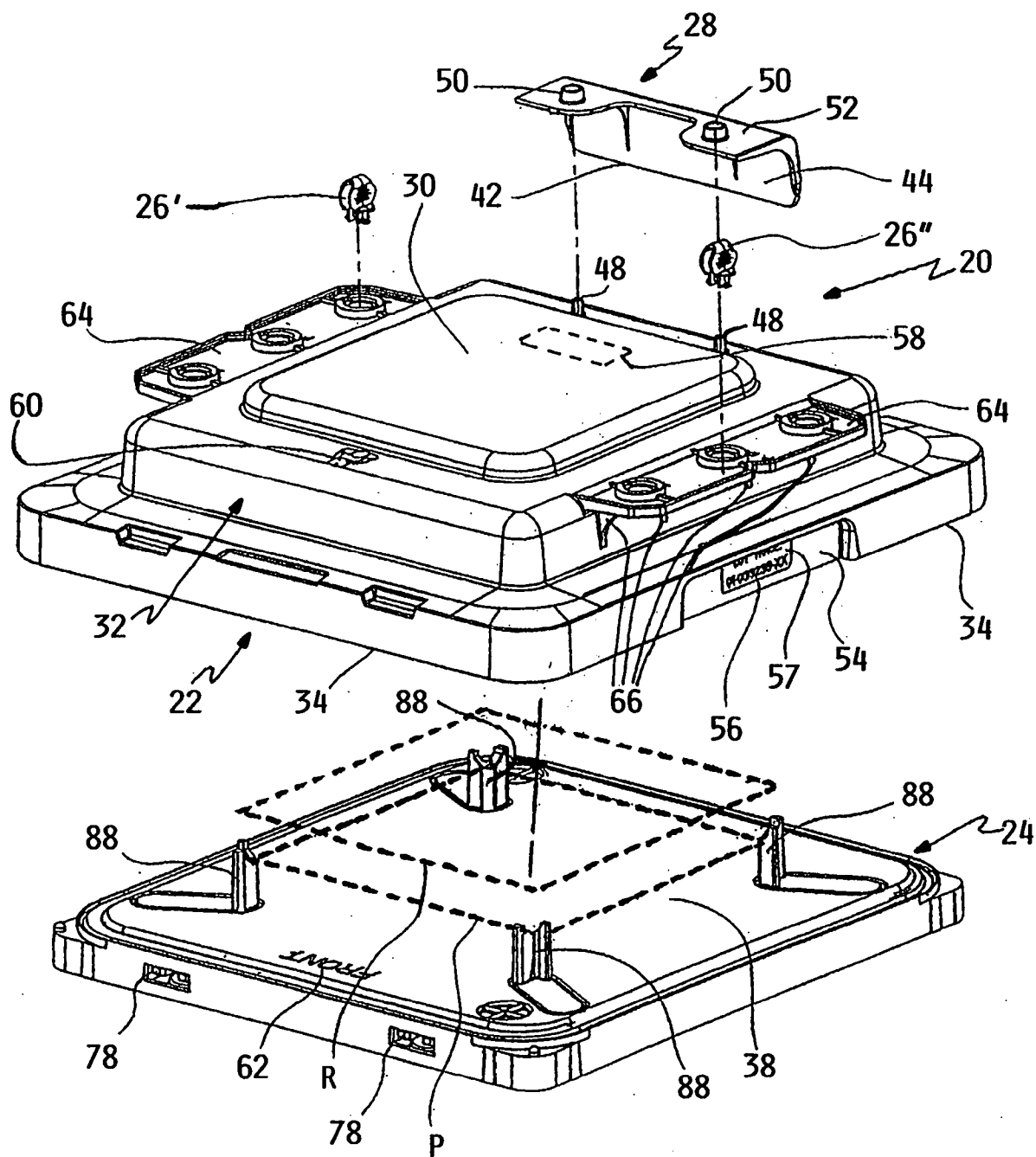
an indicator presented with said dome and selectively changeable between a first indication and a second indication for visually differentiating when said reticle is oriented in said first orientation or said second orientation.

23. The pod of claim 22, wherein said dome comprises one or more flanges thereon, said indicator presented with said one or more flanges, such that said indicator is visible by looking at said dome.

24. The pod of claim 23, wherein said dome further comprises a first aperture and a second aperture presented with said one or more flanges, each aperture adapted for said indicator, such that said first indication corresponds to when said indicator is presented with said first aperture and said second indication corresponds to when said indicator is presented with said second aperture.

25. The pod of claim 24, wherein said indicator comprises a plug.

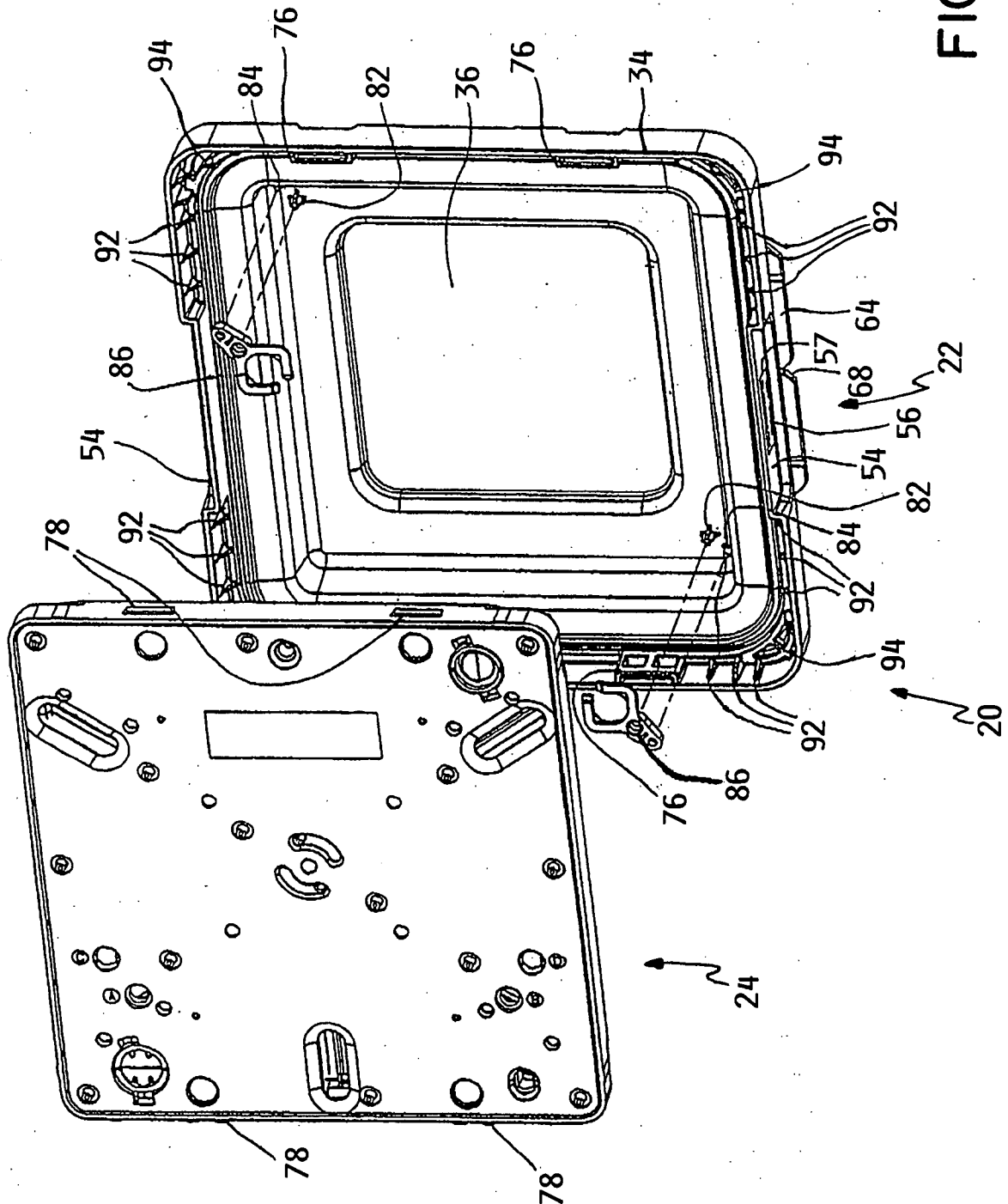
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**FIG. 1**

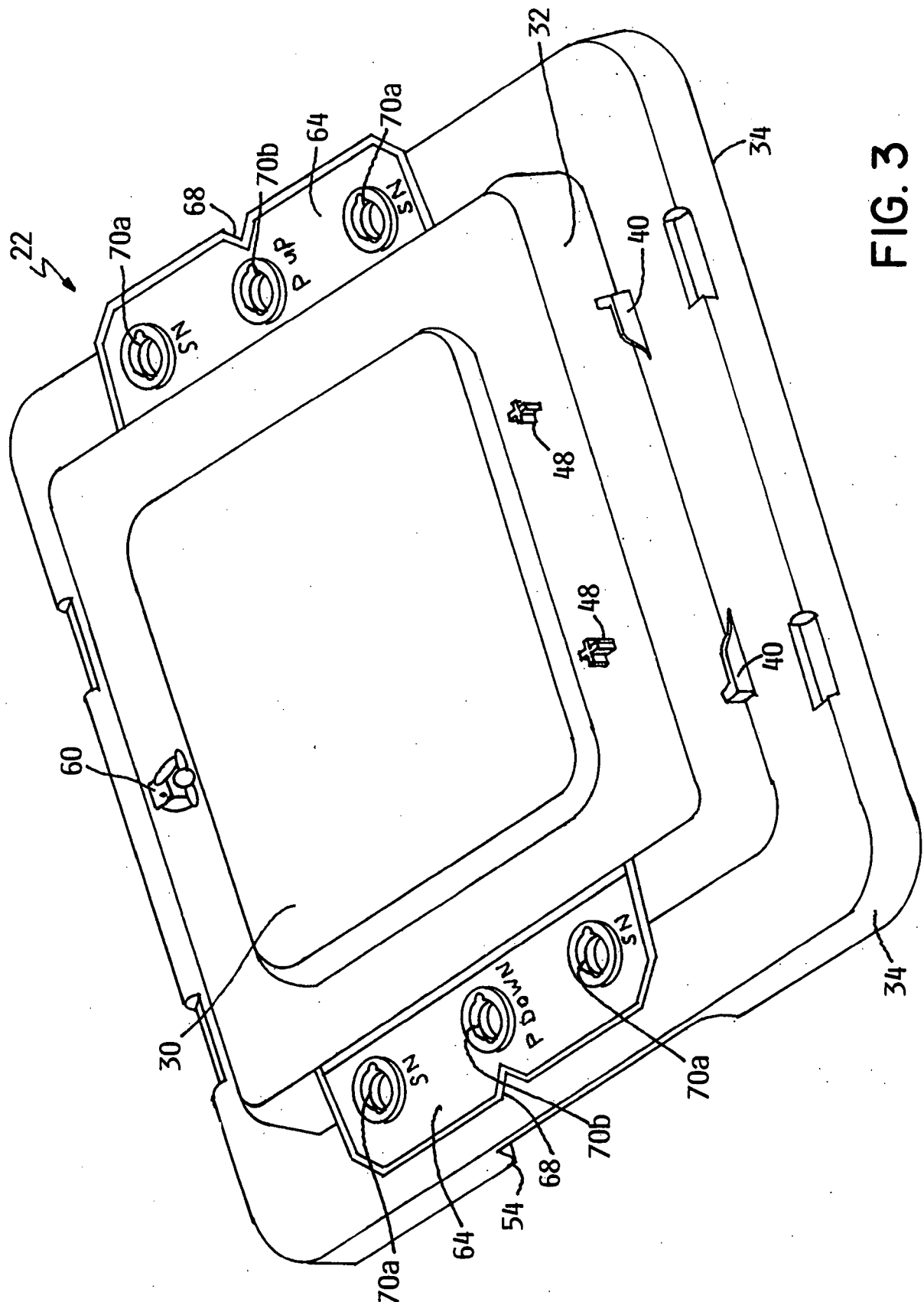
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FIG. 2



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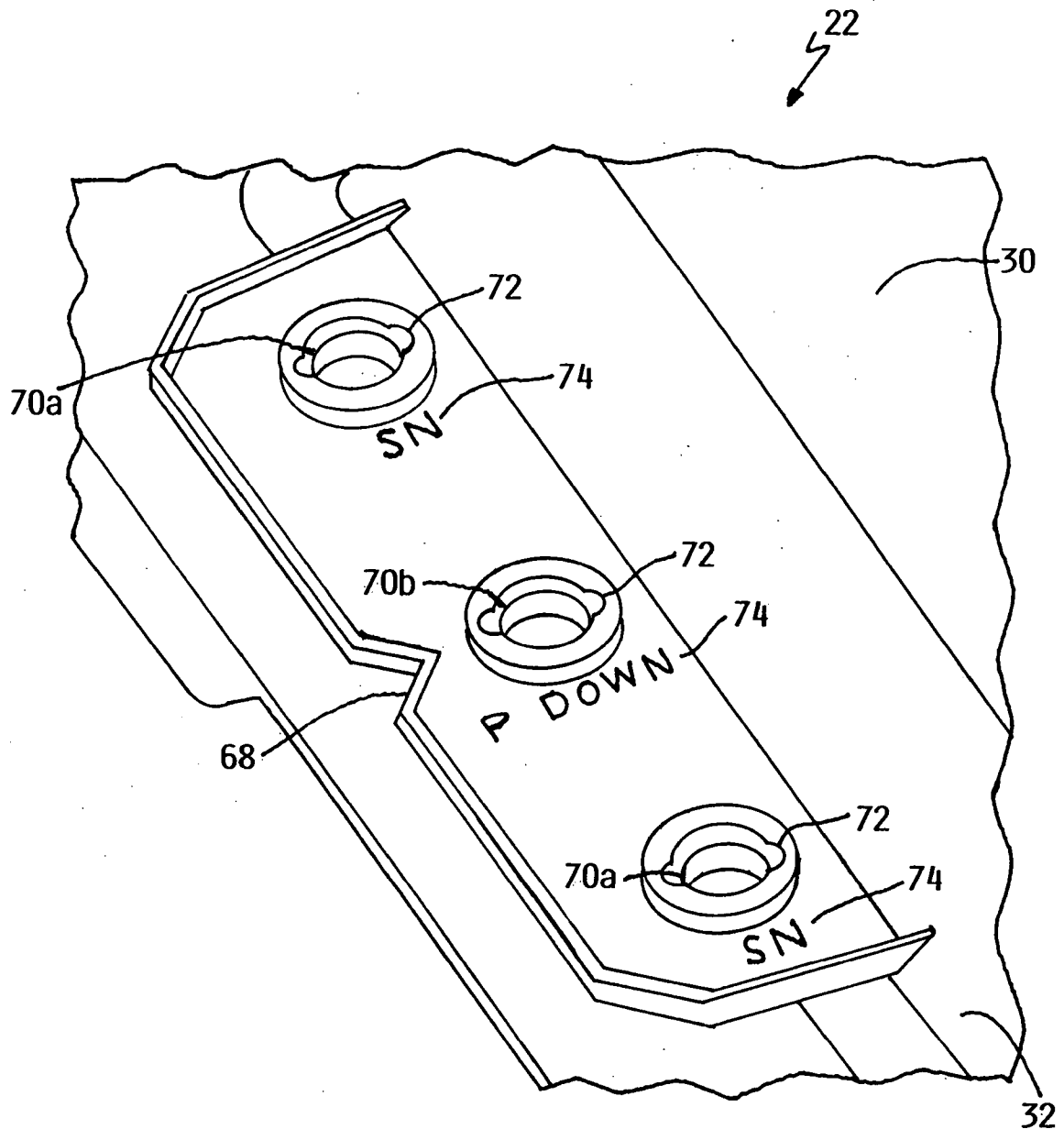
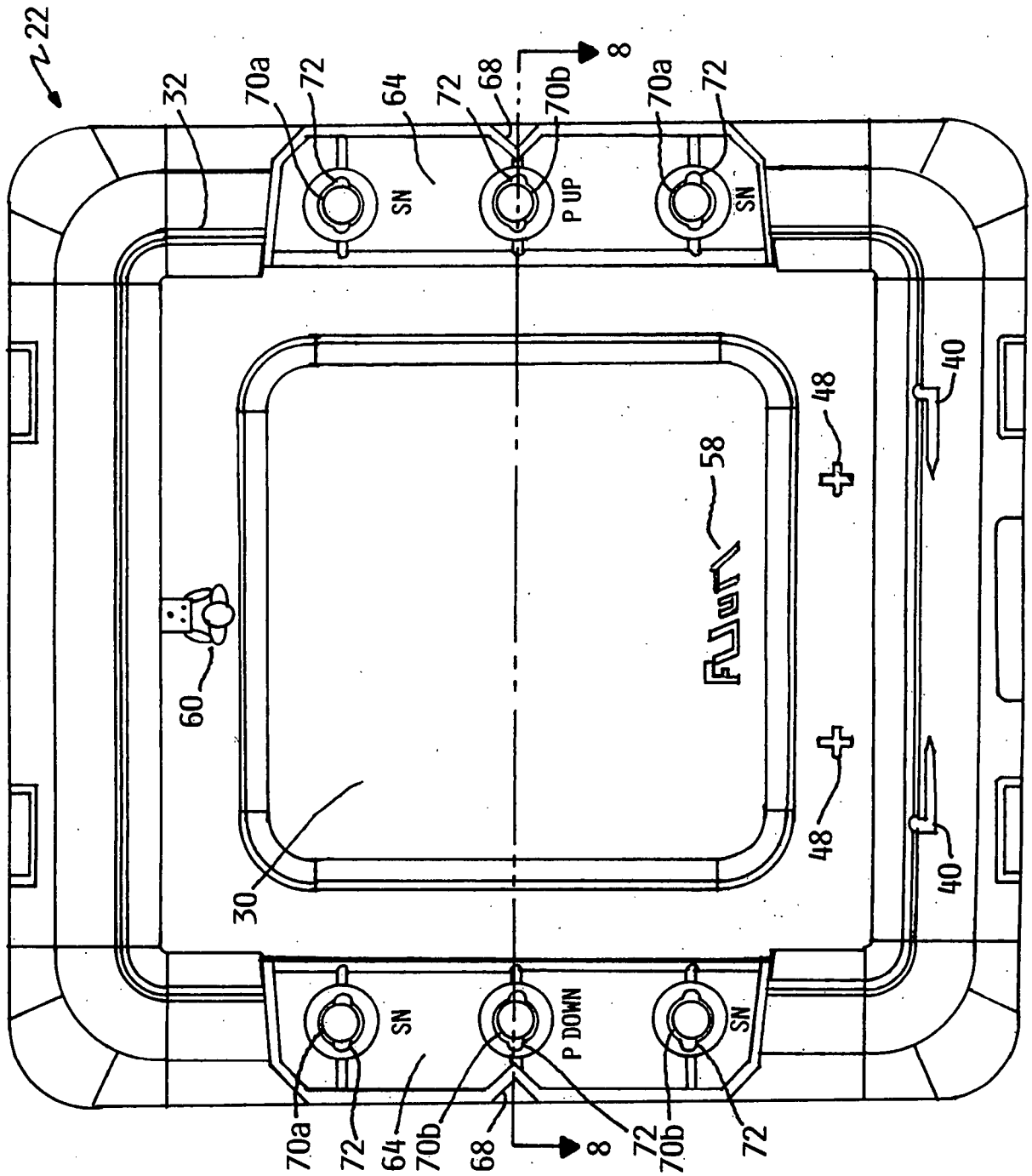


FIG. 4

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FIG. 5



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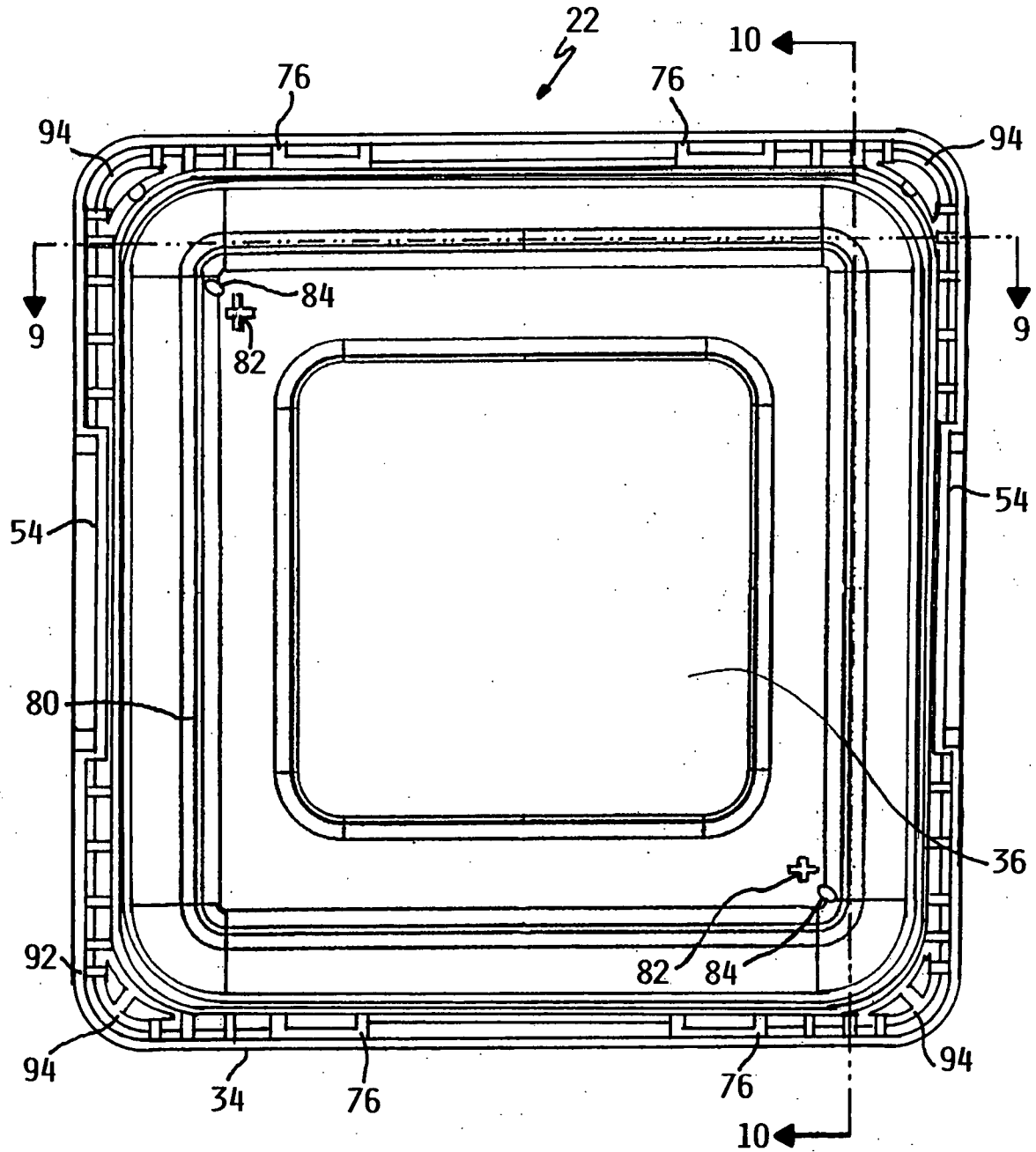


FIG. 6

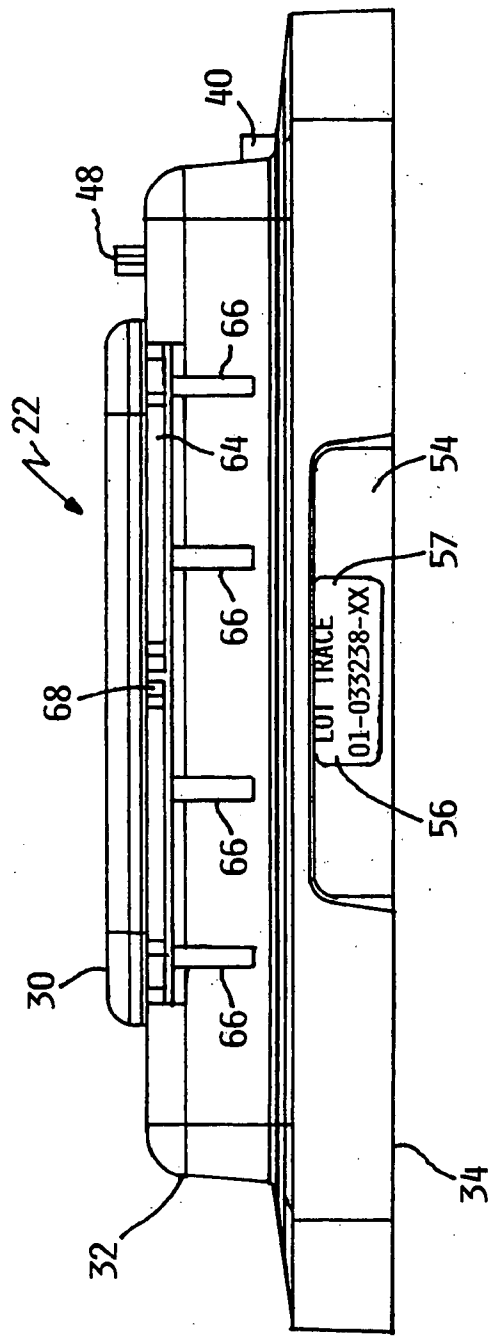
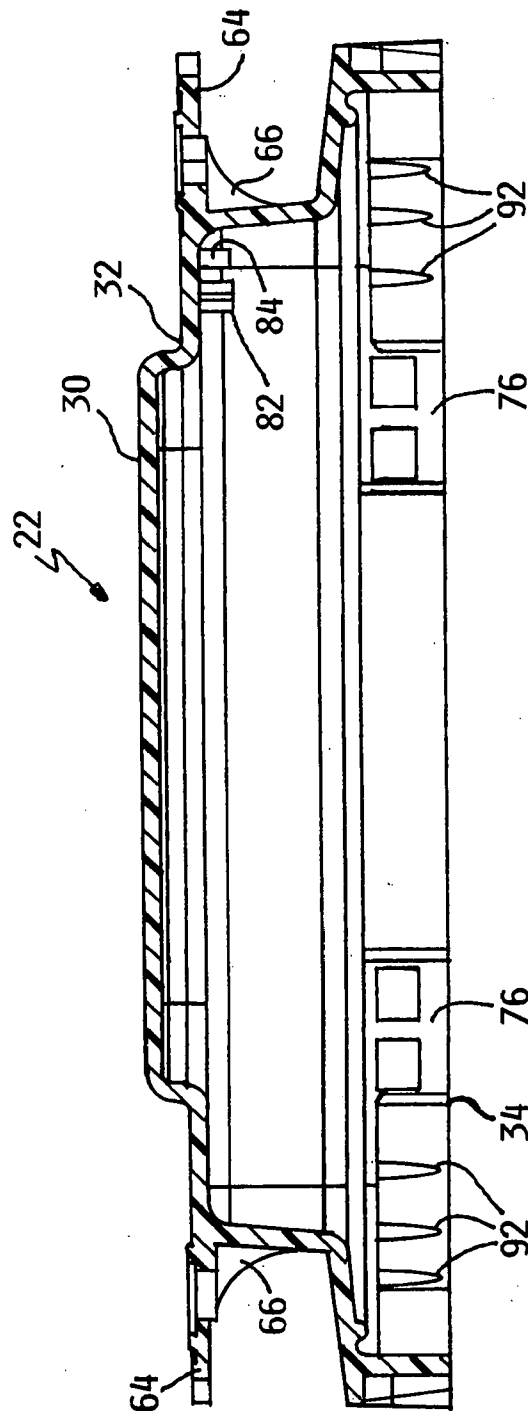


FIG. 7

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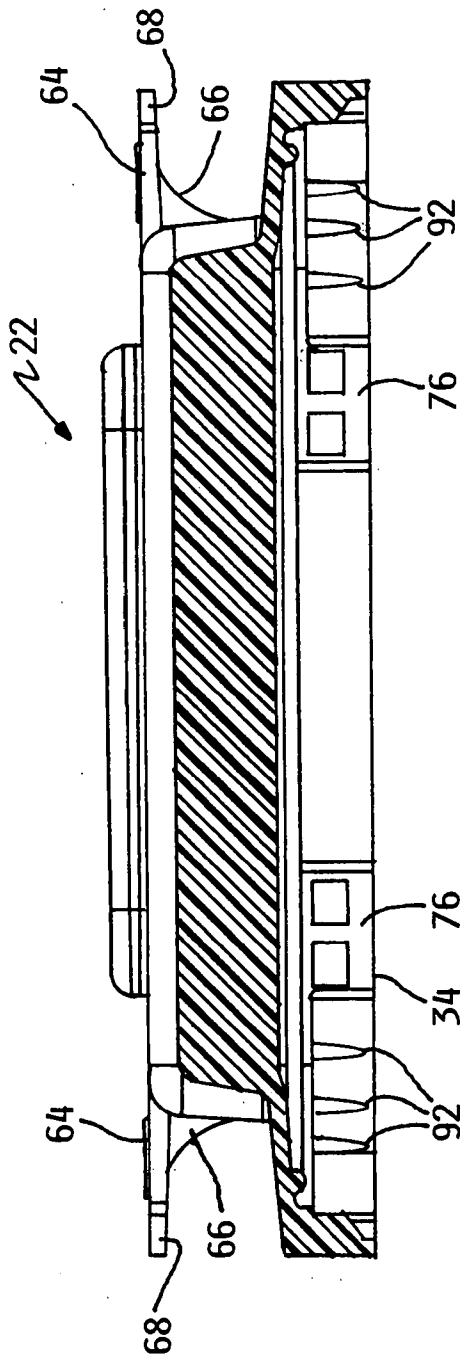


FIG. 9

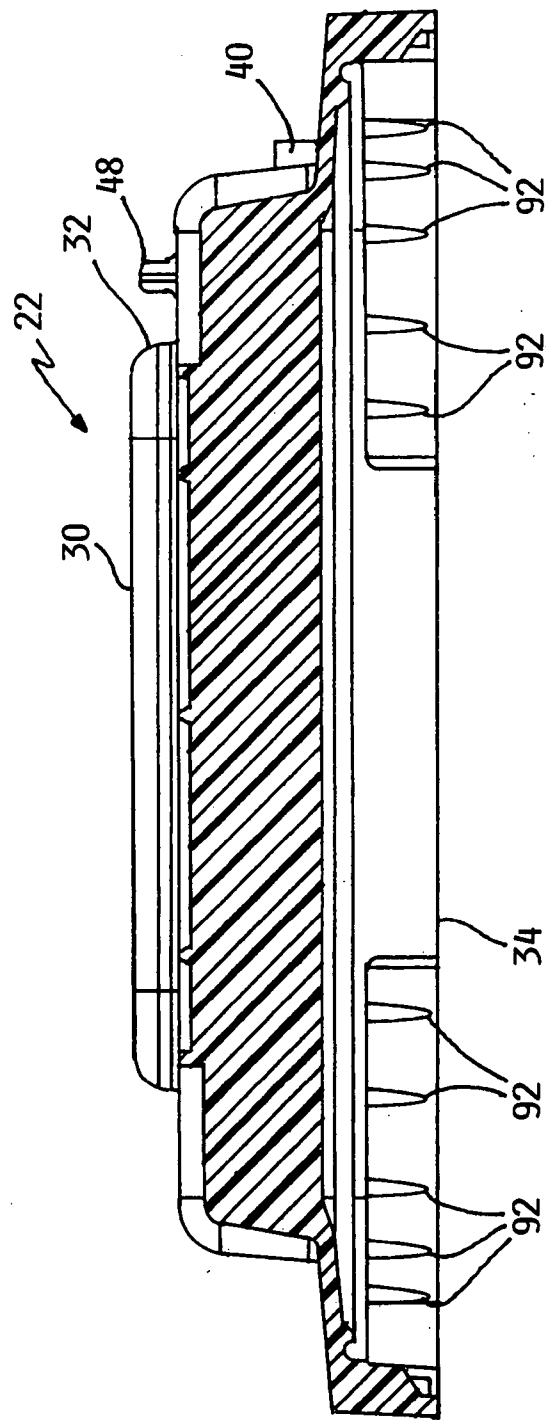
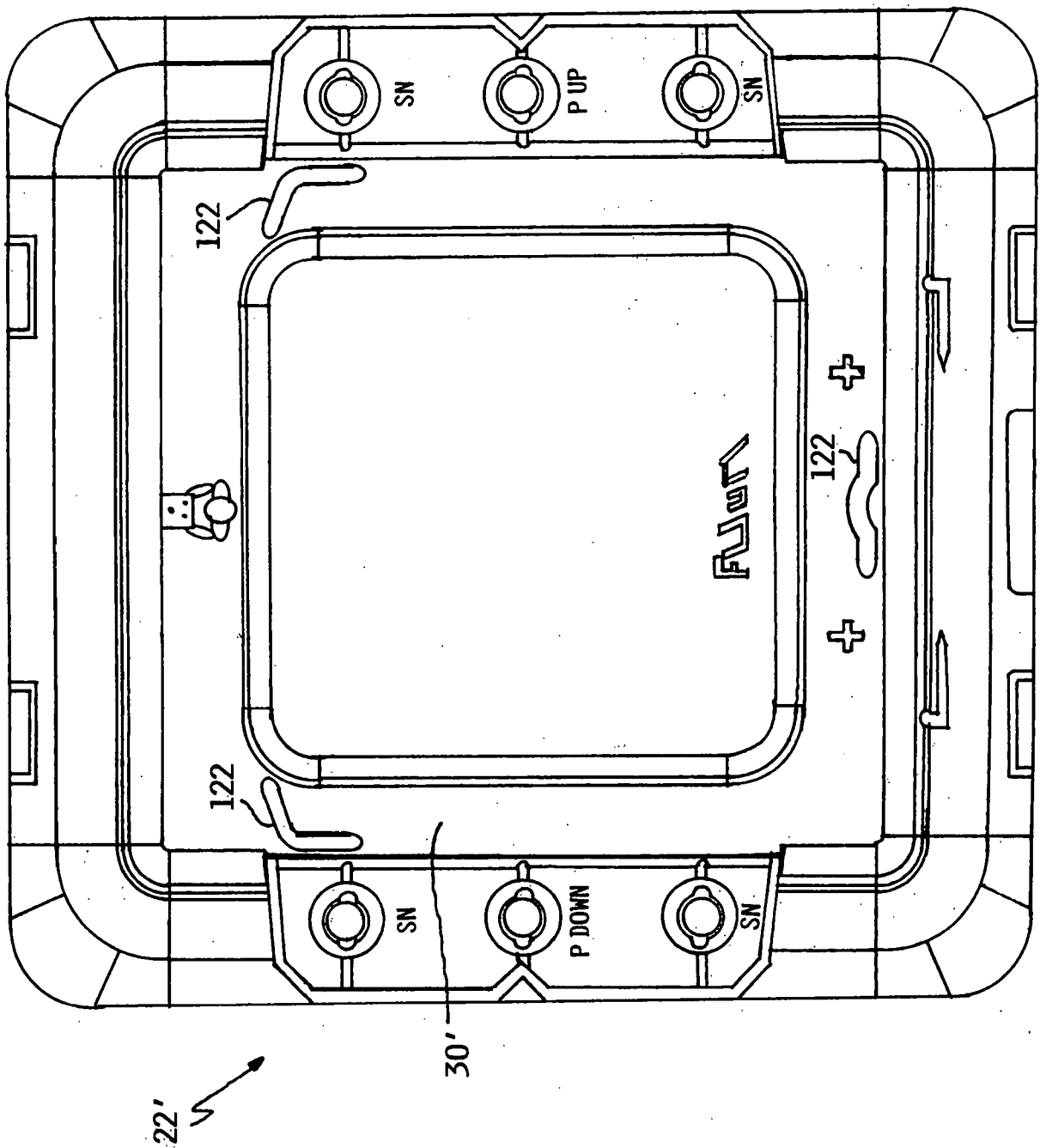


FIG. 10

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FIG. 11



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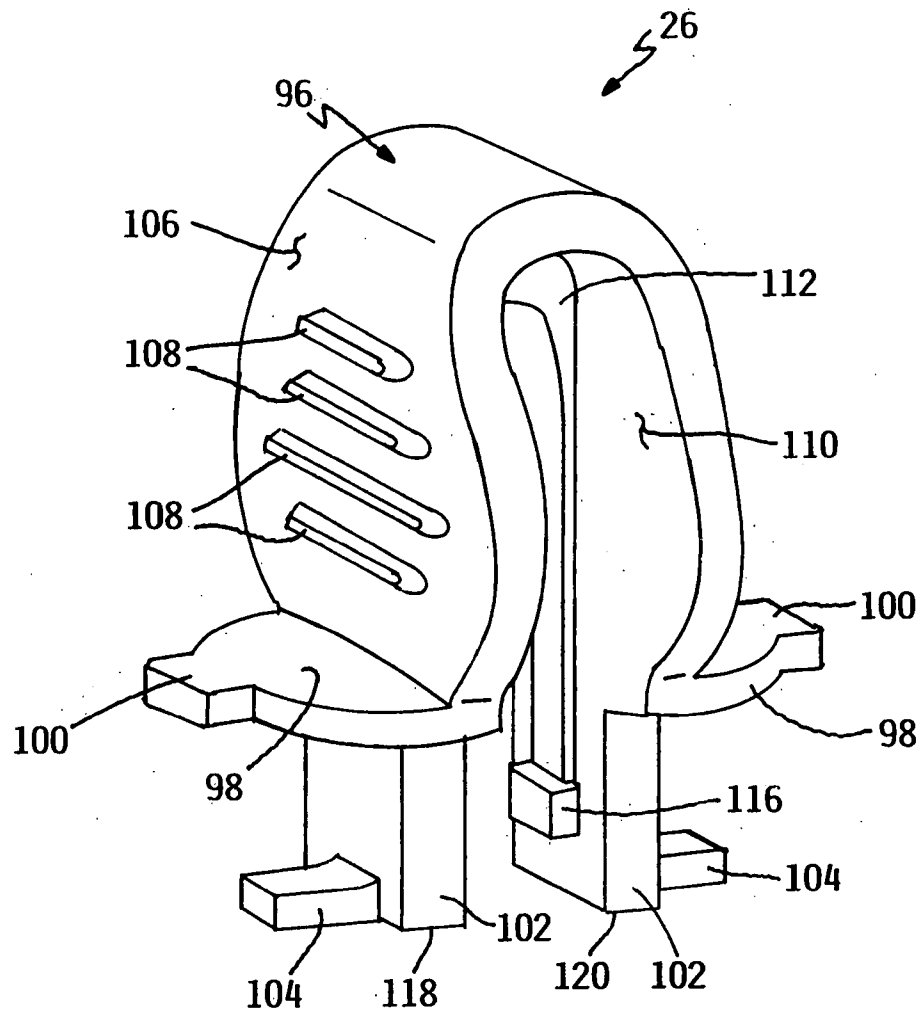


FIG. 12

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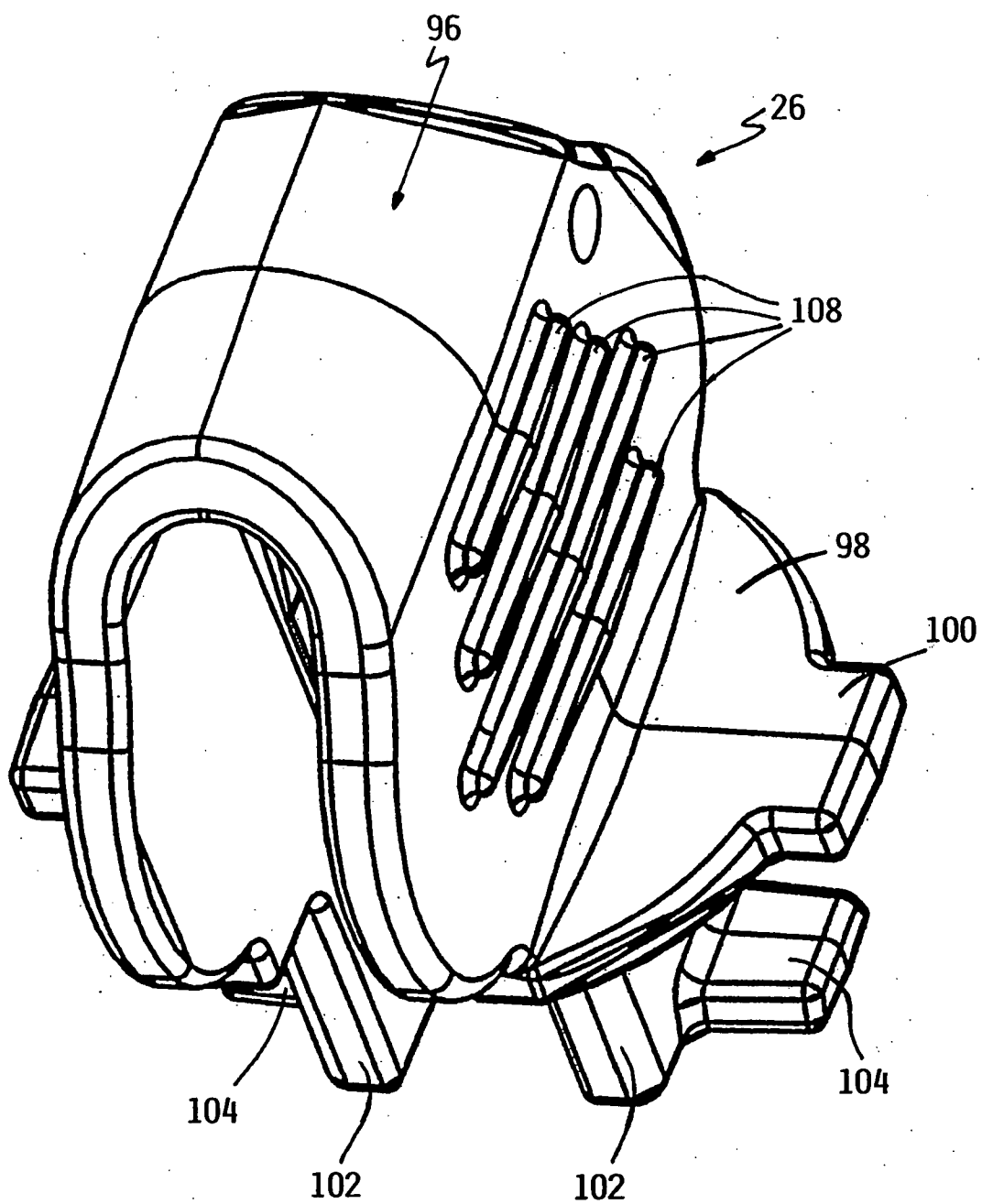


FIG. 13

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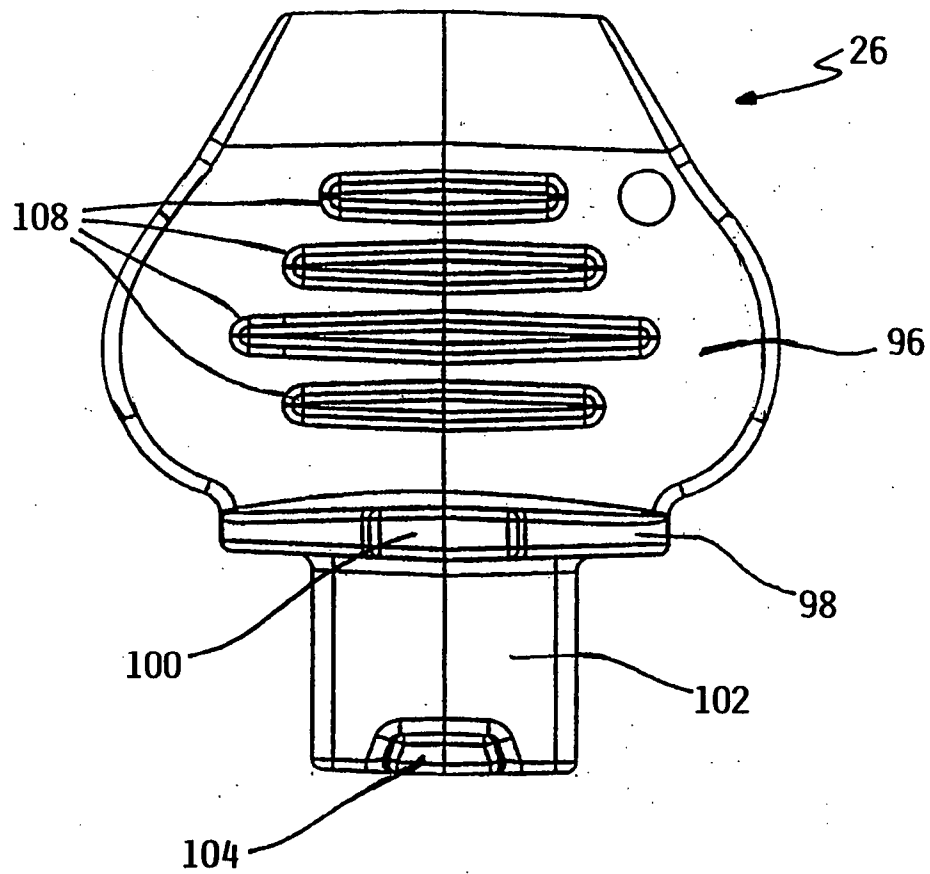


FIG. 14

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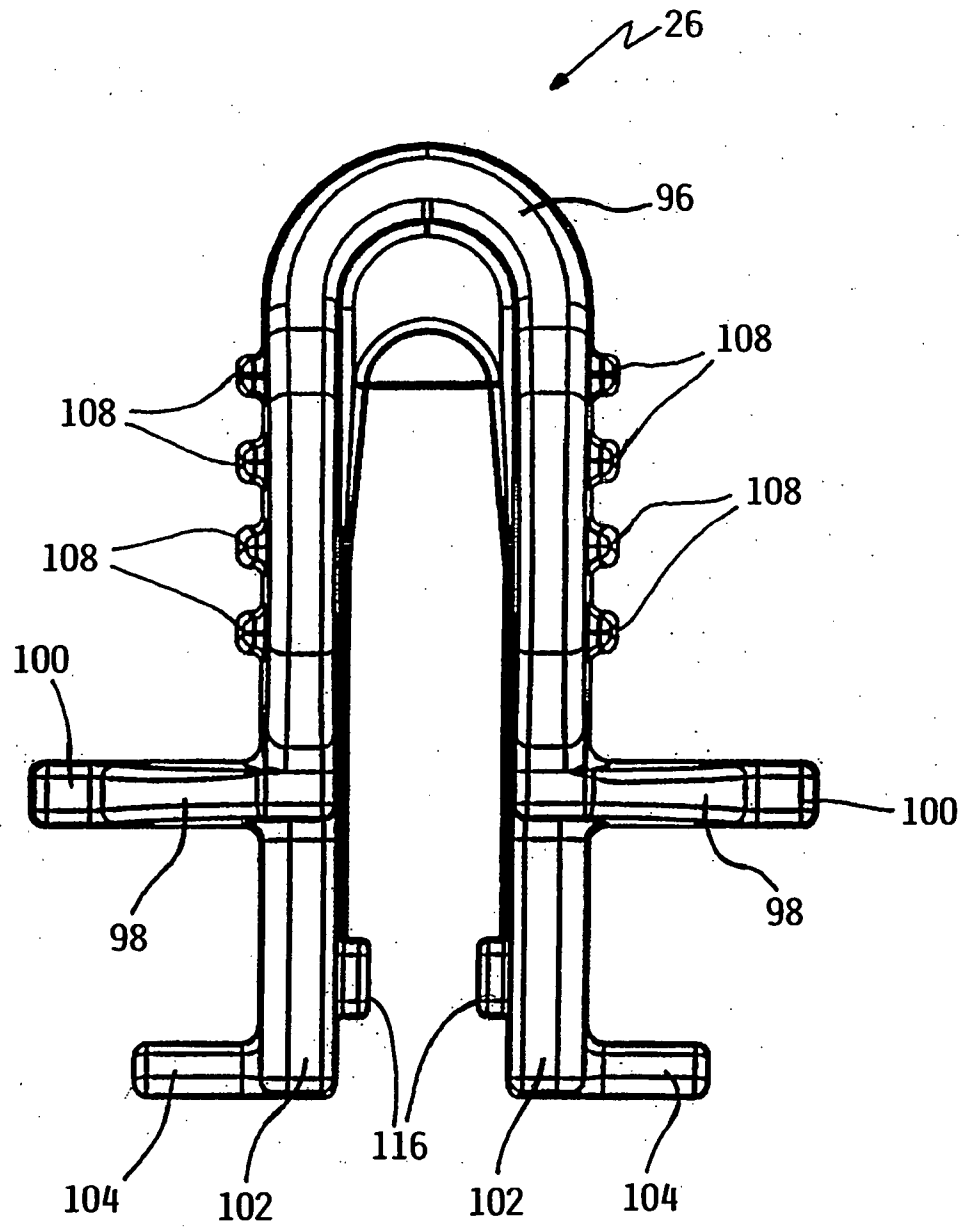


FIG. 15

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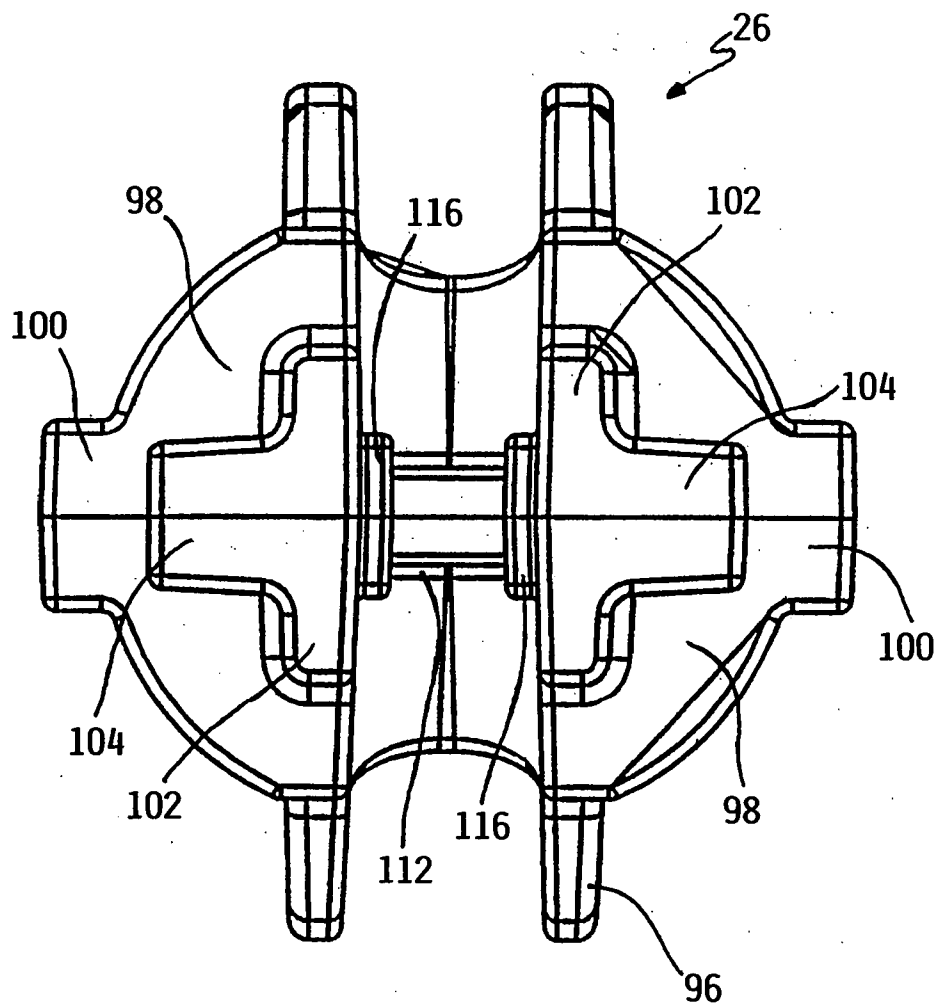


FIG. 16

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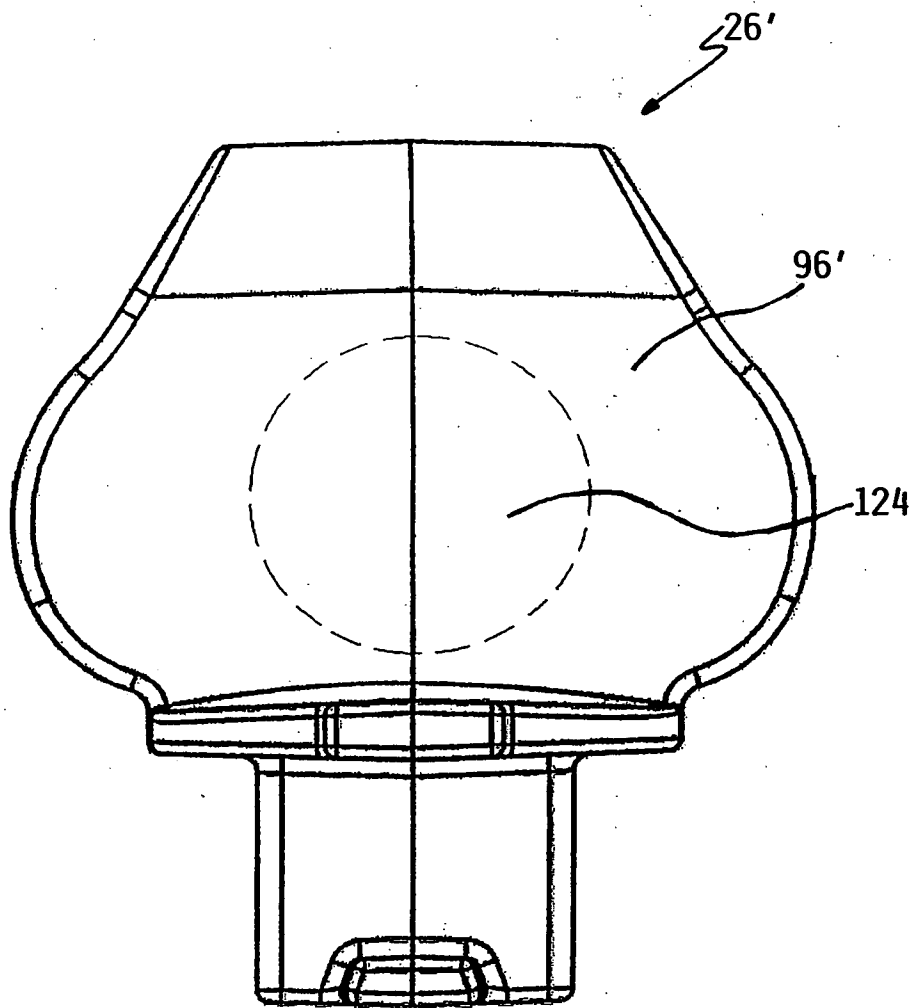


FIG. 17